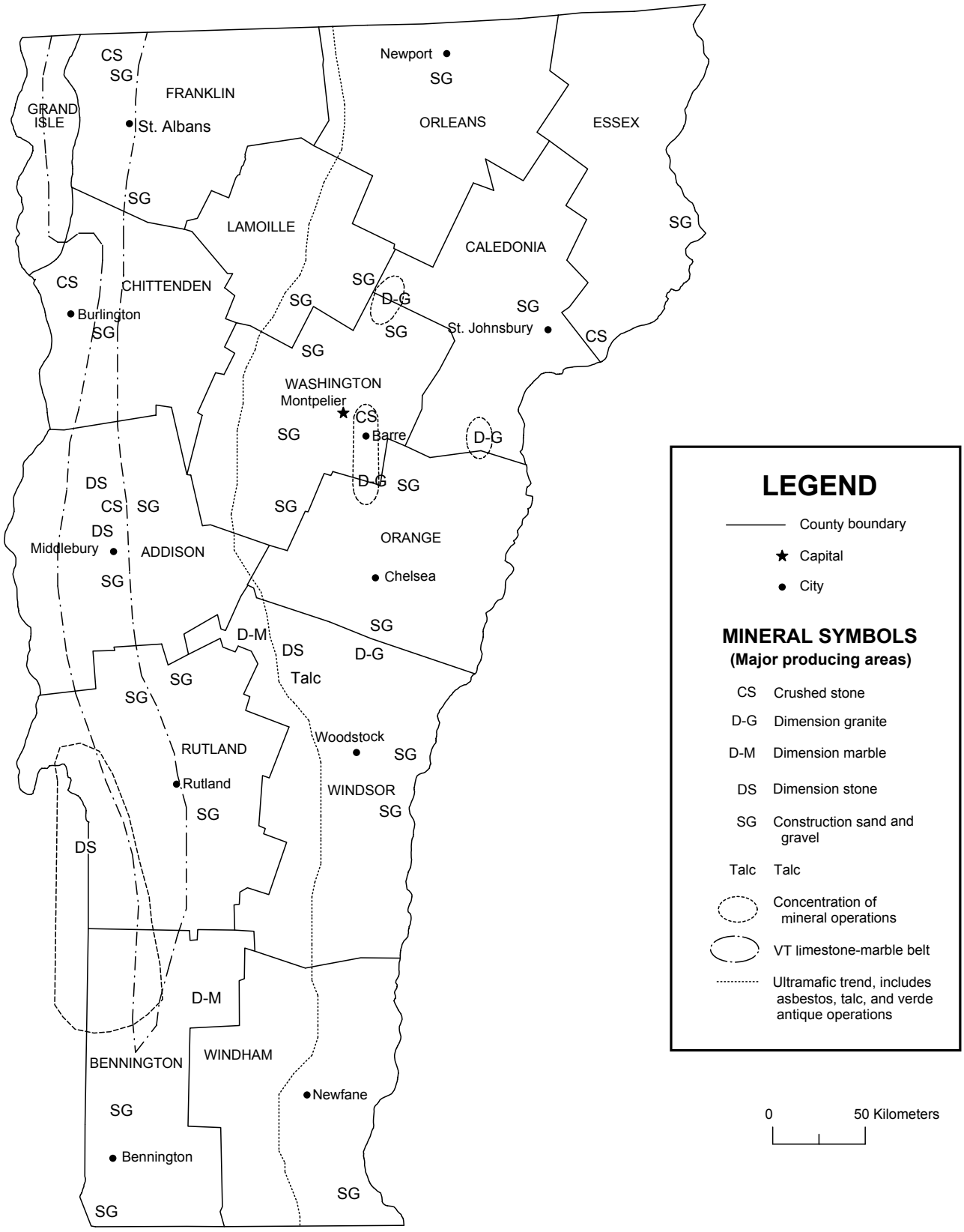
VERMONT



LEGEND

- County boundary
- ★ Capital
- ● City

MINERAL SYMBOLS
(Major producing areas)

CS	Crushed stone
D-G	Dimension granite
D-M	Dimension marble
DS	Dimension stone
SG	Construction sand and gravel
Talc	Talc
	Concentration of mineral operations
	VT limestone-marble belt
	Ultramafic trend, includes asbestos, talc, and verde antique operations

0 50 Kilometers

Source: Vermont Geological Survey/U.S. Geological Survey (2002)

THE MINERAL INDUSTRY OF VERMONT

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Vermont Geological Survey for collecting information on all nonfuel minerals.

In 2002, the estimated value[1] of nonfuel mineral production for Vermont was $70.7 million, based upon preliminary U.S. Geological Survey (USGS) data. This was a marginal decrease compared with that of 2001[2] and followed a nearly 6% increase from 2000 to 2001. Because data for talc have been withheld to protect company proprietary data, the actual total values for 2000-2002 are higher than those reported in table 1.

In 2002, dimension stone was again Vermont's leading nonfuel mineral commodity, accounting for about 40% of the State's reportable nonfuel mineral value. The production and values of construction sand and gravel and dimension stone increased, but were slightly offset by a $2.7 million decrease in crushed stone, resulting in the small net decrease for the year. In 2001, increases in crushed stone, up nearly $3 million, and construction sand and gravel, up more than $1 million, led the State's increase (table 1). Talc production and value were down about 7%.

Compared with USGS estimates of the quantities produced in the United States during 2002, Vermont rose to third from fourth among the States that produced dimension stone and remained third among those producing talc.

The Vermont Geological Survey (VGS) provided the following narrative information,[3] which includes information from the VGS and responses from Rock of Ages Corp. to the annual VGS request for information on the State's quarry and mine operations.

Mine Permitting

Several new sand and gravel operations received Act 250 (Vermont's land-use and development law) permits in 2002. Altogether, five Act 250 permits were issued for sand and gravel extraction. Permitted annual extraction rates varied from 5,000 to 100,000 cubic yards (3,820 to 76,500 cubic meters). The five sand and gravel pits are in the towns of South Ryegate, Milton, Georgia, Essex, and Northfield.

Three stone quarries were permitted in 2002. Vermont Marble Investors Group and Barney Marble Co. received a permit to increase production depth and extraction rates at the Swanton Red Marble Quarry in Swanton. Black Rock Coal, Inc. of East Montpelier received a permit to extract both slate and granite on an 45-acre (18.2-hectare) tract in Calais; the stone will be used primarily for landscaping. H.A. Manosh Corp. received an Act 250 permit for Phase 2 of an aggregate stone quarry in Wolcott. The quarry received its initial permit in 1996.

Commodity Review

Industrial Minerals

Dimension Stone.—In the granite industry, the Quarries Division at Rock of Ages Corp. reported that sales of Barre granite in 2002 remained at approximately the 2001 level, an indication that demand for the company's products seemed to be leveling out rather than continuing its decline of recent years. The influx of imported granites into the United States continued to impact the sale of domestic granites that are used to manufacture monumental products. In recent years, imports have had a significant impact on the demand for Barre Gray granite used in the monument industry.

During 2002, Rock of Ages continued to purchase and implement new technology in the Barre Gray granite quarry in order to reduce costs. Use of the diamond wire saw was increased in the quarries with much success. The water jet was tested, purchased, and found to be an excellent addition to the extraction process in the warmer months. However, because demand for the company's various colors of granite is much stronger in its quarries in the southern United States, the water-jet machinery was transferred to North Carolina and put into round-the-clock production there.

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[1]The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the minerals or mineral products. Production may be measured by mine shipments, mineral commodity sales, or marketable production (including consumption by producers) as is applicable to the individual mineral commodity.

All 2002 USGS mineral production data published in this chapter are preliminary estimates as of July 2003 and are expected to change. Construction sand and gravel and crushed stone estimates are updated periodically. To obtain the most current information, please contact the appropriate USGS mineral commodity specialist. Specialist contact information may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals/contacts/comdir.html; alternatively, specialists' names and telephone numbers may be obtained by calling USGS information at (703) 648-4000 or by calling the USGS Earth Science Information Center at 1-888-ASK-USGS (275-8747). All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals.

[2]Values, percentage calculations, and rankings for 2001 may differ from the Minerals Yearbook, Area Reports: Domestic 2001, Volume II, owing to the revision of preliminary 2001 to final 2001 data. Data for 2002 are preliminary and are expected to change; related rankings may also change.

[3]Marjorie Gale, Environmental Scientist III-Geologist with the Vermont Geological Survey, authored the text of the State mineral industry information provided by that agency.

The worldwide demand for the famous Bethel white granite remained very strong. New production methods were undergoing testing in the Rock of Ages' Bethel, VT, quarry. In addition to the diamond wire saw, hydraulic drilling equipment will become the primary type of drill used in the Bethel quarry.

Throughout all of the company's quarry operations, the fastest type of channeling equipment available is the diamond wire saw. This technology has been greatly improved upon, and manufacturers of the diamond wire tool have spent significant sums to develop various types of diamond segments for different types of granite. The use of the diamond wire tool has increased the actual yield from each quarry mostly because less stone is damaged in the extraction process.

Vermont Quarries Corp. of Rutland, VT, established a technologically advanced block fabrication plant in the underground white marble quarry in Danby. The plant, equipped with a gangsaw and polishing line, a bridge saw, and cranes, can produce up to 465 square meters (5,000 square feet) of polished marble slabs per day. The majority of dimension stone work is cut to size, and about one-third is for stock slabs. Vermont Quarries also invested in specialized training for employees to run the new equipment. Prior to the construction of the underground plant, large marble blocks were shipped to Italy for fabrication. The Danby Quarry is the only underground marble quarry in the United States and purportedly the largest in the world. The stone was used in numerous buildings worldwide, including the Thomas Jefferson Memorial in Washington, DC, the United Nations Building in New York City, and the Chiang Kai-Shek Memorial in Taiwan. Vermont Quarries has also operated the Vermont Cavendish Green (Verde Antique) quarry in Cavendish since 1999.

Calcium Carbonate.—OMYA, Inc. North America hosted a very successful open house at its white marble quarry in Middlebury during Earth Science Week 2002. Visitors were able to view and experience firsthand the rocks, quarry equipment, and products. OMYA's calcium carbonate plant in Florence, VT, which began production in 1979, was the company's first North American plant. Ground calcium carbonate, also used in the manufacture of food and pharmaceuticals, was manufactured in the Florence plant mainly for the paper, paint, and plastics industries. This plant was capable of producing dry and slurry products.

Government Programs and Activities

The VGS, also known as the Division of Geology and Mineral Resources in Vermont's Department of Environmental Conservation, continued to conduct surveys and research of the geology, mineral resources, and topography of the State. The VGS focused on the completing of the bedrock map of Vermont, new surficial mapping by quadrangle and watershed, and a natural hazard map program. In 2002, mapping projects address societal issues in Vermont: landslide hazard, riverine erosion, and nitrate and naturally occurring radionuclides in bedrock and ground water. Prototype aquifer and aquifer recharge area mapping was underway for town planning. Digital surficial and bedrock data were also used to customize HAZUS, an earthquake hazard computer program, to make it realistically simulate local Vermont conditions.

The State Geologist manages interdisciplinary studies with strong geologic components, especially those focused on surface waters, ground water resources, and geologic hazards. Review of projects as they relate to Criteria 9D and 9E of the aforementioned Act 250 is a VGS activity that recognizes the importance of lands with high potential for extraction of mineral and earth resources. The VGS also reviewed and made recommendations regarding mine and quarry reclamation plans in response to current environmental concerns. Published reports were prepared and made available to the public, consultants, industry, and government, providing geologic aid and advice to the public as required by State statute.

The VGS also provides advice concerning the development and working of rock and mineral deposits suitable for building, roadmaking, and economic purposes. The VGS maintains an archive of old and new information as per State statute. In the event of any significant discovery of hydrocarbons in the State, the VGS provides geologic services for Vermont's Natural Gas and Oil Resources Board. Additional information about the VGS is available on the Internet at URL http://www.anr.state.vt.us/geology/vgshmpg.htm.

TABLE 1

NONFUEL RAW MINERAL PRODUCTION IN VERMONT[1, 2]

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral		2000		2001		2002[p]	
		Quantity	Value	Quantity	Value	Quantity	Value
Gemstones		NA	1	NA	1	NA	1
Sand and gravel, construction		4,140	18,800	4,570	20,000	4,600	20,500
Stone:							
Crushed		5,210	21,500	4,950	24,300	4,300	21,600
Dimension	metric tons	103,000	26,600	98,000	26,500	100,000	28,600
Talc, crude	do.	W	(3)	W	(3)	W	(3)
Total		XX	66,900	XX	70,800	XX	70,700

[p]Preliminary. NA Not available. W Withheld to avoid disclosing company proprietary data. XX Not applicable.

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

[2]Data are rounded to no more than three significant digits; may not add to totals shown.

[3]Value excluded to avoid disclosing company proprietary data.

TABLE 2

VERMONT: CRUSHED STONE SOLD OR USED, BY KIND[1]

Kind	2000				2001			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	7	2,210	$8,780	$3.98	6	1,990	$8,050	$4.05
Dolomite	3	W	W	3.67	3	W	W	8.01
Granite	3	268	1,930	7.18	3	307	1,960	6.38
Marble	2	W	W	4.13	1	W	W	4.08
Quartzite	1	W	W	3.47	1	W	W	3.58
Slate	1	W	W	3.47	1	W	W	3.58
Total or average	XX	5,210	21,500	4.12	XX	4,950	24,300	4.92

W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 3

VERMONT: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2001, BY USE[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Riprap and jetty stone	W	W	$7.76
Filter stone	W	W	8.32
Coarse aggregate, graded:			
Concrete aggregate, coarse	W	W	10.19
Bituminous aggregate, coarse	W	W	11.19
Railroad ballast	W	W	9.26
Fine aggregate (-3/8 inch), stone sand (bituminous mix or seal)	W	W	7.48
Coarse and fine aggregates:			
Graded road base or subbase	365	$2,470	6.76
Unpaved road surfacing	W	W	6.85
Crusher run or fill or waste	W	W	8.27
Unspecified:[2]			
Reported	923	4,520	4.90
Estimated	3,200	13,000	4.07
Total or average	4,950	24,300	4.92

W Withheld to avoid disclosing company proprietary data; included in "Total."

[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

[2]Reported and estimated production without a breakdown by end use.

TABLE 4

VERMONT: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2001, BY MAJOR USE CATEGORY[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregates (including concrete sand)	198	$1,270	$6.39
Concrete products (blocks, bricks, pipe, decorative, etc.)[2]	11	98	8.91
Asphaltic concrete aggregates and road base materials	1,010	5,130	5.10
Fill	235	773	3.29
Snow and ice control	290	1,050	3.61
Other miscellaneous uses	105	791	7.53
Unspecified:[3]			
Reported	583	2,950	5.06
Estimated	2,100	7,900	3.70
Total or average	4,570	20,000	4.37

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes plaster and gunite sands.

[3]Reported and estimated production without a breakdown by end use.